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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPELLANTS : KATSUBE, *et al.*
SERIAL NO. : 09/066,168
FILED : April 24, 1998
FOR : PERMSELECTIVE MEMBRANE MODULE
GROUP ART UNIT : 1723
EXAMINER : A. Fortuna

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APPLICANTS' REPLY TO EXAMINER'S ANSWER

SIR:

This is a Reply to the Examiner's Answer mailed April 9, 2003 in the above-referenced application. The period to file this Reply expires on June 9, 2003.

SUMMARY

The Examiner's Answer simply fails to address the points raised in Applicants' Brief. Instead, the Examiner's Response to Arguments merely restates her prior assertions in cursory fashion.

The Applicants respectfully reiterate their position that the Examiner has not met her burden under 35 U.S.C. § 103(a) of establishing the three basic criteria of an obviousness rejection: (i) that there exists some suggestion or motivation to modify the reference or to combine reference teachings, (ii) there be a reasonable expectation of success of the combination, and (iii) that the cited references teach or suggest all the claim limitations.

The appealed rejections therefore must be reversed and claims 1-2 and 5-6 allowed.

THE PENDING REJECTIONS

Claims 1-2 and 5-6 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 4,293,419 to Sekino, *et al.* ("Sekino") in view of U.S. Patent No. 5,380,433 to Etienne, *et al.* ("Etienne"), U.S. Patent No. 5,160,042 to Bikson, *et al.* ("Bikson") and an article, *Synthetic Membranes and Membrane Separation Processes*, Matsuura ("Matsuura").

REPLY TO EXAMINER'S ARGUMENTS

The Applicants respectfully submit that the Examiner's Answer adds nothing to the record regarding Applicants' arguments, and further incorrectly asserts Applicants agreed with the Examiner's view of the teachings of the Sekino reference.

The Examiner offers nothing to rebut the arguments in the Applicants' opening brief, such Applicants' arguments as to the failure of the cited references to teach all the features for which they are cited. Similarly, there is nothing in the Answer addressing the Examiner's failure to identify any teaching or suggestion for the combination of the four cited references to obtain the present invention. For example, nothing is offered to rebutting Applicants' argument that the Examiner's combinations improperly require substantial alteration of the operation of the references, nor is there anything responding to Applicant's arguments regarding the references' teaching away from the present invention. Specific comments follow.

1. The Applicants Disagree With the Examiner's Characterization of Sekino.

The first statement in the Examiner's Response to Arguments section is incorrect. The Examiner states that

"Applicants' [sic] acknowledge the problem resolved by '419 [Sekino], e.g. the reduction in pressure loss by selecting modules connected axially within a housing as described in the discussion of '419 above, and further discussed the problem discussed by '419, e.g. the concentration polarization (solid concentration in the area of low pressure, being greater at the end of the housing away from the feed) in [a] larger housing due to loss of pressure in the housing.

Examiner's Reply at 6:19-7:7. The Applicants have *not* made any such acknowledgement.

The Examiner has mischaracterized both Sekino and the Applicant's arguments with respect to this reference. Review of Sekino discloses that the *only* discussion of pressure loss in Sekino is in this reference's statement as to why it is better to use *two hollow fiber bundles within a single container* to scale up processing capacity, rather than *a single bundle* with either longer fibers or increased bundle diameter. Sekino at 1:4-68; 5:44-52.

Specifically, Sekino notes that individual hollow fiber length is limited because pressure drop *within the individual fibers* becomes excessive when the fibers become too long. *Id.* Nothing in Sekino discusses alternative arrangements *within a two-bundle module* to minimize pressure loss across the *entire* module, as in the present invention. Nor, contrary to the Examiner's assertion, did the Applicants "acknowledge" or otherwise comment on the

Sekino's use of a two-bundle module choice instead of enlarging the bundle within a single-bundle module. Instead, the Applicants' arguments are solely limited to discussing the lower pressure drop resulting from *their* flow path arrangements within their two-bundle module (*i.e.*, central feed through end plate, radial *outward* flow through the fiber bundles, end outlet through the side-wall; Application, Fig. 1), as compared to the more torturous flow path within Sekino's two-bundle module (*e.g.*, side feed through center plate, radial *inward* feed to force non-permeate flow *into* the first bundle center, longer flow path to return to restrictive center plate; Sekino, Fig. 1).

Moreover, the Applicants did not "acknowledge" that Sekino teaches anything about solids deposition in low flow areas. In fact, Sekino does not discuss solids deposition in the manner suggested by the Examiner. In justifying the advantages of a two-bundle module over a large-diameter single-bundle module, Sekino discusses the phenomena of "concentration polarization" -- a concentration *stratification* phenomena whereby, in areas of lower pressure *in an overly-large diameter fiber bundle*, less fluid passes through the fiber walls in some regions, leaving the feed fluid in the immediate area with increased *impurity* concentrations. Sekino at 1:56-63. This discussion of dissolved impurity concentration stratification teaches nothing with respect to *solids deposition*, let alone solids deposition *at a two-bundle module outlet*. At best, this portion of the reference teaches that low flow areas within a large diameter fiber bundle should be avoided. Thus, the Examiner plainly errs in equating Sekino's discussion of "concentration polarization" in excessively large diameter fiber bundles to "solid concentration in the area of low pressure."

The Applicants respectfully submit that Sekino does not teach or suggest the features asserted in the Examiner's Answer, and that Applicants did not "acknowledge" such features.

2. The Examiner's Response Does Not Address Applicants' Arguments.

The Examiner's remaining Response merely repeat the original general assertions in the pending rejections, without rebutting or otherwise addressing Applicants' arguments demonstrating the errors in these rejections.

The Examiner again broadly asserts that Sekino teaches solids accumulation occurs at the end of a housing (Answer at 6:5-7), but offers no rebuttal to Applicants' arguments that Sekino teaches nothing regarding solids accumulation in the entirely different flow arrangements of the present invention, particularly where the Sekino outlet is located at the *center* of the module -- not the end as asserted by the Examiner -- and is located in the *face* of the center plate, not in the side wall.

Similarly, the Examiner asserts that the Sekino retentate outlet is "through the container wall" and its position "is not critical" in the module arrangement -- but offers nothing to support these statements, despite Sekino's plain teaching *only* an outlet in the face of a center plate that separates two equal-length fiber bundles. Nor does the Examiner offer any rebuttal to the Applicants' arguments that the Sekino outlet is actually through the face of the center plate, not the side wall, and that Sekino's positioning of the outlet in the center of the module teaches a completely different flow path (and resulting pressure loss and solids purging capability) than the present invention. In other words, Examiner offers nothing to rebut the Applicants' demonstrations that Sekino does not teach the features for which it is cited.¹

The Examiner's remaining assertions are similarly lacking; for example, the Examiner merely restates that Bikson teaches a central end feed inlet, and that one would be motivated to place the inlet in this manner to obtain the present invention. -- without any discussion in response to Applicants' arguments that nothing in either Sekino or Bikson (or any other source) teaches or suggests the substitution of Bikson's central feed tube into Sekino's module, given that the substitution would reverse flow through much of the Sekino module, and require a complete rearrangement of flow in the module.

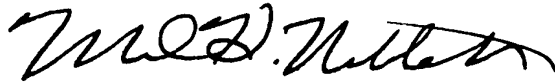
CONCLUSION

The present invention's novel arrangement of fiber bundles, feed inlet and permeate and non-permeate outlets provides a low cost permselective module that reduces pressure losses, improves separation performance and extends module life in a manner not previously taught or suggested by the cited art. For the reasons set forth in the Appellants' Appeal Brief, which stand unrebutted by the Examiner's Answer, the Applicants respectfully submit that the Examiner has failed to establish the three basic requirements of an obviousness rejection under § 103(a), and that the present invention is patentable over the combination of the four cited references. The Appellants therefore respectfully request that the pending

¹ The Applicants further note that Sekino was not previously cited as teaching location of the outlet as "not critical" in the module arrangement (*i.e.*, that the outlet may be located at the end of the module as in the present invention). The Examiner had, however, cited the Bikson reference for this teaching (*see* Examiner's Answer at 5). Even assuming the Examiner's Response to Arguments merely mis-cites Sekino in lieu of Bikson, the Examiner still fails to even discuss, let alone rebut, the Applicants' argument that Bikson teaches exactly the *opposite* -- that Bikson itself states that its outlet should be centrally located (*see* Applicant's Brief at 9).

rejections of these claims be reversed and the Examiner be directed to pass claims 1-2 and 5-6 to issue.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark H. Neblett", written in a cursive style.

Date: June 9, 2003

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